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The Current State of NFC Payments in Finland

An exploratory study on the attitudes and opinions towards NFC payments

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The purpose of this thesis was to try to understand what the current situation with Near Field Communication (NFC) payments in Finland is. NFC is a technology that enables the transmitting of information between two devices in the proximity of each other, via radio signals and has now been implemented also for payment purposes, integrating the NFC feature into credit cards and payment stickers.

One of the aims of this study was to help understand if there is consumer demand for such an innovation. Additionally was observed, if the perceived benefits to be received from adopting NFC payments were enough to attract consumers away from more traditional payment methods at the moment. Finally, was explored what have been some of the factors slowing down the introduction of NFC payments to the consumers.

In-depth interviews were conducted with two representatives from companies supporting the introduction of NFC payments. The opinions and attitudes of consumers were studied by interviewing six consumers from different demographics. Lastly, observation techniques were used to understand the usefulness of NFC payments in practice.

The results indicated that a wider adoption of NFC payments would still take time. The company representatives saw that there would to a certain extent be a demand for NFC payments and that the process of introducing NFC payments to consumers has been long, mainly because of the number of different players involved in the introduction process. More collaboration among the different players should be done in order to educate the consumer on the innovation. The interviewed consumers were highly uneducated on the innovation, indicating a need for information. The perceived benefits of NFC payments were seen to be good, but not yet great enough to attract consumers away from traditional payment methods in great amounts. The limited acceptance of the payment method was seen as a strong deterrent for adopting the innovation.

For NFC payments to be more widely adopted, better collaboration among the different players involved in the diffusion process is needed. Informing the consumer about the technology, so as to create demand for it, needs to be a combined effort of all the parties involved in NFC payments. Without efficient co-operation, the diffusion process of NFC payments will arguably continue to be slow and it will still take some time for NFC payments to become a common payment method.

Keywords	Near Field Communication, NFC Payments, Consumer Behaviour, Systemic Innovations, Innovation Diffusion

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1 Introduction

The purpose of this thesis is to help understand what factors have an influence on the introduction of Near Field Communication (NFC) payments to the consumers and whether or not there really is consumer demand for NFC payments. Additionally, the perceived benefits received from adopting NFC payments will be looked at, so as to discuss whether they are strong enough to attract users away from more traditional payment methods.

NFC is arguably a technology that will be seen to have more and more importance in the future. For many, the abbreviation NFC may cause confusion, not knowing what it is, even though, the very same confused people might have made use of the technology the very same day, when swiping their transport card against an electronic reader, so as to pay for their bus fare (MobileNFC, 2012). NFC has been incorporated into many tickets and loyalty cards, making everyday procedures a tad bit easier for consumers. The most recent area where NFC as technology has been pushing forward is payments.

There have been many studies on the introduction of NFC technology to the consumer. Most notably in Finland, a working group formed by the Ministry of Transport and Communication to study NFC, researched the relationships and factors affecting the adoption of NFC technology in Finland (NFC working group, 2011). Although, the report gave a number of recommendations on how to enhance the diffusion process of NFC as a technology, it has not specifically focused on NFC payments (NFC working group, 2011).

Literature that will be looked at will cover basic theories on consumer behaviour as well as look more specifically at how people adopt new technologies, focusing on payment methods. A number of different diffusion theories will be studied, so as to have a basic understanding of how both traditional and more complex innovations spread amongst our society.

This thesis aims to further clarify, through primary research, what factors are seen to have a greater than average influence on the diffusion process of NFC payments. Additionally will be observed what the current consumer demand for NFC payments is, since arguably consumer demand can in the end decide the faith of an innovation (UNU-Merit, 2012). Lastly will be studied the perceived benefits to be received, whether or not they are great enough to convert consumers away from more traditional payment methods.

So as to give the reader a better understanding of the rather complex concept of NFC payments, the technology will be shortly explained in the first section of this thesis. Following the explanation of NFC payments will be the literature review section, covering theories relevant to this thesis. The methodology section will explain to the reader what the research approach chosen was as well as how the primary research was conducted in practice. The Findings from the research will be listed and presented in the section following the methodology, before going into the discussion part, where the findings will be contrasted to the theories covered earlier, so as to possibly try and explain what was discovered and what might affect the results. The overall conclusions from the thesis, possible recommendations and areas for further research will be covered at the very end of this thesis.

2 Near Field Communication (NFC) as a Technology

Near Field Communication is based on Radio-frequency Identification (RFID), a technology that uses radio waves to transmit data between an RFID reader and an RFID tag (Ok & Coskun, 2011: 73-75). Because the data between the tag and the reader is transmitted via radio waves, there is no need for physical contact, making possible innovations such as contactless payments (Ok & Coskun, 2011, ss. 73-75).

NFC uses the RFID technology to transmit data between two devices in different operational functions : "…reader/writer, peer-to-peer, and card emulation where communication occurs between an NFC mobile on one side, and a passive RFID tag (NFC tag), an NFC mobile or an NFC reader on the other side." (Ok & Coskun, 2011: 73-75). The ease of use of the technology is a big advantage for it, since when two matching devices are put within close range of each other the devices automatically pair up, without difficult instalments (Ok & Coskun, 2011: 73-75). A typical example of this said pairing is when a consumer puts his or her NFC payment card within a few centimetres of a NFC accepting payment device; the card is activated and transmits data to the payment device, causing a transaction.

To use NFC there must always be at least one device communicating that has the reader/writer capabilities, the other party can be a mere NFC tag, which can be read and written on by the first party (Innovision Research & Technology plc, 2006). The most common types of visible NFC technology are the NFC stickers, or tags (seen in figure 1) which are rather affordable to manufacture and easy to distribute through retailer-branding (National Retail Federation, 2011). The tag can also be in card form and some retailers even in Finland have taken it upon themselves to test the NFC technology with loyalty card schemes initially, before perhaps taking the next step of implementing the whole payment system (Kesko, 2012) (figure 2).

Figure 1(right) elisa Lyyra Payment Sticker 10 March 2013. http://kotimikro.fi/uutiset/elisa-teki-puhelimesta-lompakon

Figure 2(left) Kesko NFC Loyalty Card, 10 March 2013. http://www.kesko.fi/fi/Kaupat-ja-palvelut/Ajankohtaista/Lahiluettava-K-Plussa-kortti-valittiin-parhaaksi-NFC-konseptiksi-Suomessa/

A full blown adaption of NFC payments made by phone has yet to be seen, one major reason being that although the phones have the capabilities, they have lacked the Secure Element (SE), which would enable the transactions to be better encrypted and secured (Mobey Forum, 2011) In Finland, the handset manufacturers and mobile network operators (MNO) are finally coming to an agreement that the SE will in the future be embedded into the Universal Integrated Circuit Card (UICC) or as it is better known the common SIM card (RFIDLab, 2012). This solution has already been piloted in Estonia and results are awaited of its success (ELIKO, 2012).

Figure 3 Visa Paywave, 11 March 2013, http://usa.visa.com/personal/cards/card_technology/paywave.html

In figure 3 is seen the simplified NFC purchasing process, where the consumer first waves his or her card in the proximity of the reader, causing a transaction to happen, after which the consumer claims his or her purchases as usual.

3 Literature Review

The purpose of this literature review is to provide a theoretical background for the reader so as to understand the basics of how consumers behave and how innovations in general are introduced to the markets. The theories discussed in this section will also provide to be useful when discussing the findings of the primary research underpinning this paper.

3.1 Consumer Behaviour

As with any type of innovation or product which requires consumers to adopt it for it to be successful, it is important to understand the basics of how consumers behave and what aspects influence the probability of adopting certain products. The basic theories on consumer behaviour will be covered in the following paragraphs.

There are numerous aspects that have an effect on how consumers act. Kotler (2008: 240-260) states that the internal factors that influence consumer behaviour are divided into four groups: cultural, social, personal and psychological. Cultural factors include the culture, subculture and social class of the consumer. Culture covers the values, perceptions and wants of users that have been moulded through learning from their surroundings. These values, perceptions and wants are not always conscious, but very often subconsciously affect the buying behaviour of consumers. Belonging to a certain subculture or social class can also guide the buying behaviour of a consumer. Even though, one might think of themselves as an individual, consumers often tend to mimic the buying behaviour of others belonging to the same groups as them (Kotler, 2008: 240-260).

Social factors include membership, reference and aspirational groups. These are all groups whose opinions influence the purchasing behaviour of consumers. People value the opinions of their teammates or family members and often might follow the example of their good friends, trusting the choices they make. Aspirational groups refer to the groups to which consumers would want to belong, thus they might change their behaviour to fit that of the group in question (Kotler, 2008: 240-260).

Personal factors such as the age, occupation, economic situation and lifestyle among other things have an influence on how consumers behave. The buying behaviour of a wealthy pensioner might differ from that of a twenty year old college student, as they are in totally different phases of their lives and most likely economically in different situations as well. Personality traits and self-image can also have an influence on buying behaviour. One might often buy products which are seen to fit the image that one has of themself and that complement their personality traits. (Kotler, 2008: 240-260).

The last category of internal factors includes psychological factors: motivation, perception, learning and beliefs. Motivation defines the reason why consumers want something whereas perception refers to the process of analysing the information available to make decisions. Learning happens after initial trials: once consumers have tried something they learn whether they want to make the same decision again or not. Lastly, there is the aspect of beliefs and attitudes. Beliefs may be based on knowledge, opinion or faith; they can be irrational or rational. Attitudes are the way people constantly evaluate certain aspects in life, partly to speed up the evaluation process of everyday life situations. Attitudes and beliefs are one of the more difficult things to change, since they are shaped through the different aspects mentioned earlier, such as the opinions of the consumer's reference groups, thus if one wanted to change the beliefs of a consumer, the process would arguably be challenging (Kotler, 2008: 240-260).

It is important to remember when observing consumer behaviour that it is a complex process with a lot of different aspects affecting it and none of the previously mentioned factors stand alone, but are intertwined with one another and together shape the behaviour of a consumer. It can be hard to change some aspects of consumers, such as cultural and psychological aspects, which is why when introducing innovations or products, marketers should play to the characteristics that already exist in the consumers (Kotler, 2008: 240-260).

Having covered the basics of consumer behaviour, it is important to understand how consumers act when making decisions. Especially in understanding purchasing

behaviour it is good to understand how the decision to purchase is made. This will be covered in the following chapter.

3.1.1 Consumer Decision Process

In the process of making a purchasing (figure 4), or in the case of an innovation or making an adoption decision, the consumer has to recognise that he/she has a problem or a need that has to be attended to. He/she then starts to search for information to be able to meet this recognised need. After some searching he/she has probably found a number of alternatives, which he/she then must evaluate to see which one is the one for him/her. Here also the internal and external factors affecting consumer behaviour, discussed earlier, come into play. The elements that have an importance in the evaluation process include: 1) the purchasing intention, why does he need to buy something new?; 2) the attitudes of others; what do other people think of these alternatives? Unexpected situational factors might also arise which could postpone the adoption or purchase of a product. If one loses his/her job; price and costs could arguably become more important in the evaluation process due to the change in the economic situation of the individual (Kotler, 2008: 265-272).

Risk avoidance plays a big role in all purchasing decisions. People tend to postpone or at least reconsider buying something if they are not convinced about the possible outcome of that purchase. It is important for marketers to understand what makes consumers uncertain and anxious about certain products and learn how to reduce the feeling of risk, so as to increase the adoption rate of a product (Kotler, 2008: 265-272).

Figure 4 Buyer Decision Process (Kotler, 2008: 265)

Postpurchase behaviour is the final step of the buying process, defining whether or not the consumer is actually satisfied with the product. The rate of satisfaction is highly dependent on the prepurchase expectations i.e. what is believed to be gained from purchasing/adopting this product in comparison to the product's perceived performance. The bigger the gap between the expectations of the product and the actual performance and benefits received, the bigger the dissatisfaction of the consumer. Especially with a new to the markets innovation, it is important not to oversell it, since if the first people who adopt it, also known as opinion leaders, find that the hype does not match the actual benefits received, the negative opinions can spread fast and deter the adoption process of the product tremendously, starting a snowball effect that could be hard to reverse (Kotler, 2008: 265-272).

Having explained how consumers make purchasing decisions, it is essential to understand what influences the consumers' decisions on selecting payment methods to be used at the point of sale.

3.1.2 Payment Method Selection

As with the traditional decision making process or purchasing process the consumer's practice for choosing a payment method is also arguably complex, but unlike the traditional purchasing processes, there is a limited amount of literature covering this topic. An essay paper on the topic by Stacey Schreft of the Federal Reserve Bank of Kansas City, was one of the more detailed papers that covers the topic analytically, looking at the different aspects influencing the consumer's choice of payment method, at the same time pointing out the lack of research in this field (Schreft, 2006).

Schreft (2006) defines the payment method selection process to be complex, describing it as a multidimensional process. Consumers are faced with a lot of payment options out of which they need to select their preferred option. The various benefits received from the different methods guide consumers in their decision process. According to Schreft, once the consumer has established a purchasing need, he/she must next decide whether to make the purchase out of current or future funds. The size of the purchase is also important in the selection process, cash often being used

for smaller transactions. The choice of payment depends also highly on the merchant's acceptance of payment methods (Schreft, 2006).

Before being able to make decisions at the point of sale on which method of payment to use, consumers need to decide on what payment instruments to carry with them (Schreft, 2006). So as to have a more comprehensive look at how the decisions on adopting payment instruments are made, the technology acceptance model (TAM) by Fred Davis will be looked at.

3.1.3 Technology Acceptance Model

Probably one of the most fundamental writings on technology acceptance was by Fred Davis in 1989. Davis and his colleagues set up two studies to observe the importance of different factors in a person's usage decision making process, as well as the decision to adopt a technology. Already early on, they had theorised that the ease of use and perceived usefulness were of the most importance for a person, when the users had to self-predict their usage of a certain technological product. Davis found out that the most important factor influencing the analysis of current use and predicted use for people was the perceived usefulness of a product. He noted that, although the ease of use is important in the adoption decision process, it alone is not enough to attract people to adopt a product, but rather, the ease of use is a supportive feature for perceived usefulness i.e. it can enhance or deter the perceived usefulness of a product. Davis noted that it is not surprising that perceived usefulness carries the strongest influence, since users are prone to adopt applications based on the functions they perform and how easy the system is to use (Davis, 1989).

As noted earlier, Davis argued that the ease of use can enhance the adoption of a product perceived as useful, making it easier to use. However, what people perceive as useful and easy to use are, according to Davis, linked to the personal aspects of a consumer, thus, if a product is not seen as useful or easy to use, it might not be the objective truth but merely the opinion of the person (Davis, 1989). The writings of Davis produced the Technology Acceptance Model (TAM) (figure 5), which is often used as a basis for analysing the adoption of technology. The TAM links the perceived ease of use, perceived usefulness and behavioural intention to use together; the actual

use of the technology being dependent on the aforementioned factors. As discussed earlier, the perceived ease of use is seen to complement the perceived usefulness of a product (Davis, 1989).

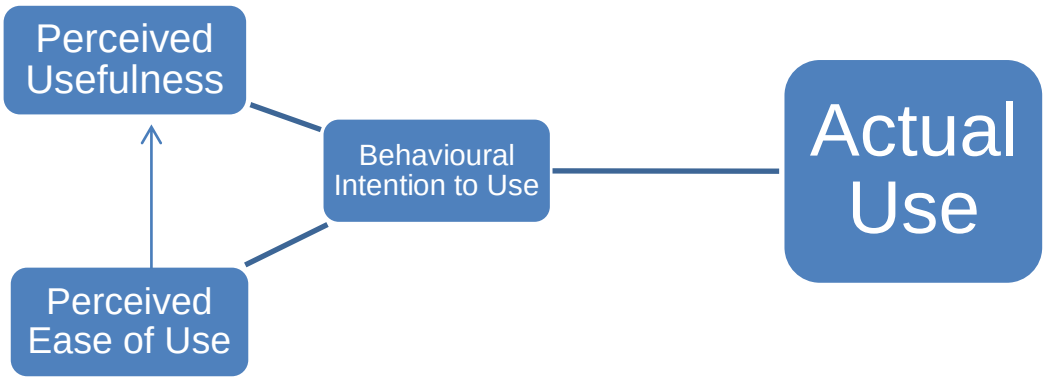


Figure 5: Technology Acceptance Model adapted from Davis (Davis, 1989)

In the case of mobile payments, there have been a couple of additional factors added to the TAM, when analysing the likeliness to adopt mobile payments. Amin (2007) researched the adoption of mobile credit cards in Malaysia, adding additional elements to the TAM so as to have a more complete understanding of how Malaysians adopt mobile payments. He noted that consumers will also look at the perceived credibility (PC) of the product, as in is it safe and secure, before adopting it. PC alone was not seen as strong enough to encourage or discourage adoption. Additionally, Amin saw that the amount of information available on the innovation would also on its part work to encourage or discourage adoption (Amin, 2007).

Another group of researchers from Malaysia also studied the adoption of mobile payments, adding to the TAM factors such as: social influence (SI) and Personal Innovativeness (PI) (Tan;Tan;& Ooi, 2011). They saw that social trends can help increase the adoption rate of the payments. Personal innovativeness arguably is related to what Davis (1989) already brought up in his writings; that in the end a lot of the adoption process is dependent on the person's characteristics and behaviour, as in how willing the person is to accept new technologies.

So as to better understand why consumers would possibly consider adopting NFC payments, a few main benefits are discussed in the following section.

3.2 The Perceived Benefits of Adopting NFC payments

There are numerous articles on the perceived benefits of NFC payments; however, there are only a limited amount of credible studies on the topic. Mallat (2006) studied the adoption of mobile payments in Finland, in a more general view, not focusing particularly on NFC payments; nevertheless her writings give understanding to the general benefits to be received from mobile payments. In her study consumers found that mobile payments carry a convenience benefit over traditional wallets, reducing the need for queuing and having to carry cash (Mallat, 2006). Another report written by a Finnish NFC work group also found, when studying the benefits of NFC technology to the consumer, the convenience factor to be the biggest advantage for the common consumer (NFC working group, 2011).

So as to better understand how innovations are introduced to the markets and what is meant by the diffusion process of innovations the writings of Everett M. Rogers will be looked at next.

3.3 Diffusion of Innovations

The traditional diffusion process of innovations has been probably best coined by Everett M. Rogers (born 1931), who wrote the book *Diffusion of Innovations* originally in 1963 (Backer, 2005). Diffusion is as Rogers defines it "...the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003: 5). Rogers (2003) argued that far too many writers before him believed only in the spontaneous spread of ideas, but he claimed that in fact the spread of an innovation could and should be planned. According to Rogers (2003) there were four main elements that need to be considered in the diffusion process: the innovation, communication, time and the social system. Another key point he introduced was that of the *Innovation-decision Process.* Rogers believed that whenever a person was planning on adopting a new product they would go through

five stages: awareness, interest, evaluation, trial and adoption (Rogers, 2003: 168-169). First the consumer had to become aware of the innovation. If his interest was sparked he would then evaluate the product. After evaluating it externally he would then test it and depending on the results of that trial decide to either adopt the product or not (Rogers, 2003: 168-169)

The most notable contribution from Rogers (2003) was the innovation adoption lifecycle (sometimes referred to as the technology adoption lifecycle), which showed that society consists of different types of adopters, who adopt innovations at a different pace.

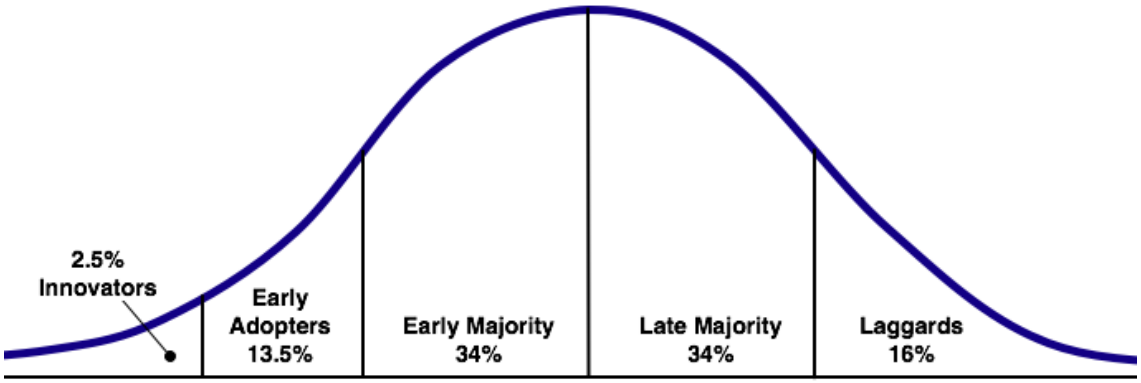


Figure 6 The Innovation Adoption Lifecycle, Adapted from Diffusion of Innovations, Rogers (2003), 30 March 2013, from Wikimedia Commons, 30 March 2013 http://upload.wikimedia.org/wikipedia/en/archive/4/45/20110714211709!DiffusionOfInnovation.png

As seen in figure 6, *The Innovators* are a type to be the first to try new things eagerly and are willing to take risks, just for the sake of being the first, but they might not have influence on the decisions of others (Rogers, 2003). It is the *Early adopters* who are also sometimes called opinion leaders (Kotler, 2008), who communicate the new innovation to the *Early Majority* who are somewhat risk adverse, but still adopt the innovation earlier than the average, or *Late Majority* user (Rogers, 2003). *Laggards* are the last group of users that adopt any innovation; they adopt it mostly because they have to, not because they want to (Rogers, 2003).

The *Diffusion of Innovations* (Rogers, 2003) provides the fundamentals of understanding how innovations spread. However, it can be argued to be too simple to help understand how an innovation such as the NFC payment system is spread. To complement Rogers' theory on diffusion we look at a set of other writings.

3.3.1 Diffusion of High-Tech Innovations

Geoffrey A. Moore is known for his contributions in the technology industry, especially through his book *Crossing the Chasm* (Moore, 2013). Moore's book expands the original concept of the *Technology Adoption Life Cycle,* developed by Joe M. Bohlen, George M. Beal and Everett M. Rogers, by indicating that there is a gap between different parts of the innovation adoption lifecycle, which an innovation has to cross, in order to survive (Moore, 1999).

Moore states that there is a gap between all of the different types of adopters, but the most critical one is between the *Early Adopters* and the *Early Majority*, many innovations failing by not being able to cross this chasm. He argues that it is rather easy to sell highly complex new innovations to the technology savvy *Innovators* and even to the *Early Adopters,* because they are willing to accept a few minor hiccups and bugs in the technology, seeing the value in having the new possibly advantageous innovation. *Innovators* and *Early Adopters* are not afraid of possible complex innovations, because they believe that the innovation can bring benefits to them, at least in the short run. A harder sell, according to Moore, is that of getting the *Early Majority* to take on the new innovation. One of the biggest difficulties in crossing the chasm, according to Moore, is the fact that to a large extent the *Early Majority* are pragmatists, as in they are not easily lured into accepting a new technology (Moore, 1999).

The bigger of an innovation one has to get over the first large chasm, the bigger the momentum behind that innovation has to be (Moore, 1999). Especially in the case of a new complex technology as NFC, firstly the benefits of adopting this technology have to be transmitted crystal clear, in other words the message has to be sticky (Moore, 1999; Gladwell, 2001: 89-133). Moore (1999) argues that linking the innovation with

strong brands will help the pragmatists to "trust" the new innovation as being good, thus approving it more easily.

The models introduced by both Moore and Rogers can be supplemented by the writings of Taylor and Levitt (2005) on the diffusion process of systemic innovations. Systemic innovations, such as the NFC, are innovations that when implemented in an industry, require changes in a number of processes.

3.3.2 Diffusion of Systemic Innovations

John E. Taylor and Raymond E. Levitt (2005) from the University of Stanford have written academic discussion papers on the topic of innovation diffusion. They expanded the concept of architectural innovation, developed by Henderson and Clark (1990) in their paper *A New Model for Systemic Innovation Diffusion in Project-based Industries (2005)*. Systemic Innovations are unlike incremental innovations. When introduced, they require multiple different aspects to change accordingly in the industry for the innovation to be a success (Taylor & Levitt, 2005). Taylor and Levitt (2005) researched in their paper the issue of systemic innovation diffusion and why the diffusion process of these systemic innovations takes longer and what could be done to make the process faster.

Taylor and Levitt (2005) studied the topic within a project-based industry context, looking at examples from the U.S. residential homebuilding industry. They argued that because in today's modern business world outsourcing is extremely popular, breaking up tasks among numerous different parties, not having single companies handling multiple tasks, it is harder to introduce new innovations to the industry efficiently (Taylor & Levitt, 2005).

Taylor & Levitt claim that if the markets are highly fragmented the innovation is less likely to be adopted fast throughout the industry. The process of diffusing an innovation can be sped up by integrating your operations vertically, taking over many different tasks and procedures that would normally be handled by others (Taylor & Levitt, 2005).

The key points that the work of Taylor and Levitt (2005) brings out is the fact that often for systemic innovations, it is not the innovation that is flawed or needs to be polished, but it is the ecosystem it is brought into. They list numerous constructs that are visible in the house building industry and essentially can hinder the diffusion process of a systemic innovation: 1) Organisational Variety; how much the different contractors vary, long-term relationships being preferred to smoothen the diffusion process, because one would not have to introduce the innovation constantly to new operators; 2) Degree of Interdependence; how well are different units connected within an organisation through their tasks to one another, a high interdependence would enhance the diffusion process of an innovation; 3) Boundary strength; the more separate different trades, for instance restaurants and grocery markets are; the slower the diffusion process for a common innovation is; 4) Span; between how many trades will the innovation span; the more interfaces it has to span over, the longer the diffusion process is. The above mentioned constructs are examples of possible constructs for an innovation and do not represent all of the possible constructs, nor are they necessarily always present in every type of industry (Taylor & Levitt, 2005).

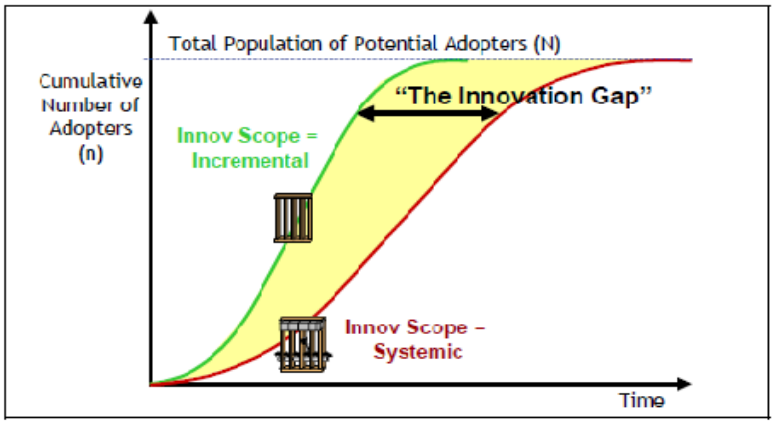


Figure 7: The Innovation Gap. (Taylor & Levitt, 2005)

As Taylor and Levitt (2005) visualise in figure 7, the constructs that face a systemic innovation create an "innovation gap" between the diffusion time of an incremental innovation and a systemic innovation.

In their paper *Modelling Systemic Innovation in Design and Construction Networks* (2005b) Taylor and Levitt supported their earlier work, by bringing out the importance

of understanding the relationships within different inter-organisational networks and how strong relationships can help make the diffusion process of systemic innovations much faster. The writings of Moore (1999) and Rogers (2003) help gain fundamental knowledge on how traditional high-tech innovations spread within the society. Taylor and Levitt's (2005) (2005b) writings on systemic innovations complement the previously mentioned diffusion and adoption theories, in explaining the importance of looking at the relationships of different players in the field and the structuring of different companies.

Since NFC payments will mostly be visible in the retail environment it is good to have an understanding of that area as well. So as to better understand factors influencing innovation adoption in retail environments, the writings of Hristov and Reynolds, from the University of Oxford (2007) will be looked at.

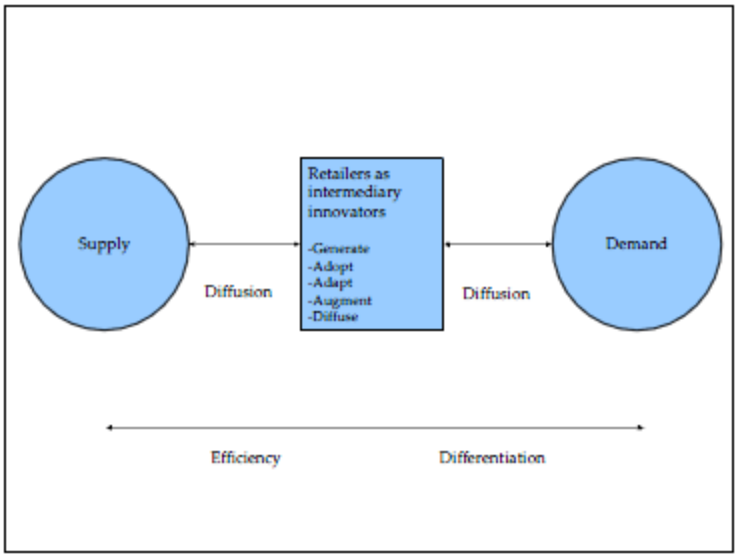
3.4 Innovation Adoption in Retail Environments

In their report on *Innovation in the UK Retail Sector*, Hristov and Reynolds (2007) describe the characteristic of the retailers as innovators and innovation adopters. They mention that retailers usually work as innovation hubs, deciphering existing and impending consumer needs, communicating them upstream to suppliers. Retailers are also painted to be slow diffusers of technology, especially large retailers, due to obvious technical difficulties, when innovations need to be implemented across multiple chains. (Hristov & Reynolds, 2007).

Hristov and Reynolds (2007) identify that the main driver behind innovation is the customer. They point out that this is a rather obvious conclusion, seeing that the retail industry is a customer-facing industry. They do credit the competitive environment and technology, among other issues, to have influence on the likeliness to innovate or adopt innovations, still leaning heavily towards the importance of consumer trends and opinions as key-external drivers for innovation. In the report it is stated that companies can innovate for the simple reason of utilising new available technology, but that there has to be in the end a benefit for the consumer. Companies can be from culture motivated to be innovative, but yet again, the company culture alone cannot be the sole reason to implement new procedures and technology. Internally companies seek

improvements in operational efficiency and sales, among other things, when implementing new innovations (Hristov & Reynolds, 2007).

The report compiled by Hristov and Reynolds (2007) implies that there is two ways innovations diffuse within the retail environment: Supply diffusion and Demand diffusion. One could see supply diffusion as a top down process, suppliers pushing the innovations to the retailers, whereas demand diffusion is the opposite; the consumers demanding changes and innovation from the retailer, this demand then being transmitted through the supply chain all the way up to the developers. As illustrated in figure 8**,** the two different innovation processes differ in their characteristic, in the sense that the end result of supply diffusion is usually a differentiated offering to the consumer, whereas with demand diffusion the innovation process is more efficient, since there are clear demands that are to be matched with this innovation (Hristov & Reynolds, 2007).



Source: Hristov, 2007

Figure 8 Two-way innovation diffusion, **(Hristov & Reynolds, 2007)**

The report by Hristov and Reynolds (2007), further clarifies the importance of listening to the consumer when considering innovations. As figure 8 shows, the innovation process as a whole is more efficient when there is a clear demand for the innovation.

4 Methodology

4.1 Research Objectives

Even in Finland there have been studies on the implementation of NFC technology, however not in the context of NFC payments, thus further research was to be conducted, to better understand the current consumer demand and overall situation of NFC payments (NFC working group, 2011).

So as to have a more comprehensive understanding on the demand and problems for NFC payments and the importance of the perceived benefits received from adopting them, the following research questions were formed:

> "Is there currently consumer demand for NFC payments in Finland?"
>
> "Are the perceived benefits to be received from adopting NFC payments great enough to encourage adoption of the technology by consumers?"
>
> "What have been the biggest obstacles in slowing down the diffusion process?"

4.2 Types of Research

There are two main types of research that can be conducted; conclusive and exploratory. An exploratory design aims to help the researcher to find out and understand the problem at hand, often by using qualitative research methods, such as interviews and focus groups. A conclusive design is more used when it is better known, what is to be exactly studied and there are clear issues to be researched. When conducting a conclusive research design there are two possible designs that may be taken: causal and descriptive. With a causal design the researcher studies the cause and effect of certain issues, whereas in a descriptive design, hypotheses are tested through mostly quantitative research methods, such as surveys. The overall research design for this thesis is arguably a mixture of both conclusive and exploratory research, having more emphasis on the exploratory design, because the aim is to as the name suggest, explore issues (Shukla, 2008: 29-59).

4.3 Research Approach

An interpretive approach to the research enables the studying of NFC payments in a more exploratory way, so as to not necessarily provide a single answer for the questions stated, but rather, raise discussion on the topic. The aim for an interpretive approach is to examine the different perceptions of people involved in the issue studied (Greener, 2008: 34-35). In the case of NFC payments shall be studied the perceptions of the supplier/merchant and consumer side, so as to have a more complete view on the opinions on this innovation.

4.4 Research Design

For an interpretive research where one aims to examine the attitudes, feelings and motivations of people, a qualitative research design was felt to be more fitting (Greener, 2008; Proctor, 2005). A qualitative research design makes it possible to use research methods which are more probing so as to be able to get a better understanding of the research topic (Proctor, 2005). For this thesis, six in-depth interviews with consumers were conducted, as well as two interviews with merchant side representatives. In addition to the interviews, observation of the practicality of NFC payments was done by the author.

4.5 Methods

4.5.1 In-depth Interviews

The topic of this thesis and its contents being of a rather complex nature, in-depth interviews were chosen to be conducted with different parties involved in the diffusion process of NFC payments, so as to be able to clarify unclear terms and concepts to the interviewees, if necessary. In-depth interviews enable the researcher to better uncover the beliefs and motivations behind the opinions of people (Proctor, 2005: 234). Being in a one-to-one situation makes it possible for the interviewer to be fully focused on a

single interviewee at a time, being able to explain to him/her difficult issues as well as probe for more questions, if needed (Proctor, 2005: 234).

Especially on a topic as complex as NFC payments, conducting a survey would not have arguably made sense, because of the apparent general lack of information on NFC in general. Interviewing enables the impromptu creation of additional questions so as to probe deeper into the opinions of the interviewees, which is especially important in an interpretive research. The personal interview situations also make it possible to observe non-verbal signs, if there are any. (Proctor, 2005: 234-235).

4.5.2 Observation

NFC payments being arguably still in a very early stage of adoption, it was felt, that to fully have an understanding of the practical implications and possible perceived benefits of NFC payments first-hand testing was needed. For observation to work properly, the test situation must be completed in a short period of time, be predictable and the situation has to be observable i.e. did the product work or did it not work (Proctor, 2005: 251).

Observation is found to be a good technique in order to have more concrete results from actions taken. Interviews are good at indicating the planned actions of people; however, it might not be the case that the people would actually go through with these plans. Often, when interviewed about previous actions, such as shopping behaviour, interviewees have to rely on memory and especially if they have not yet used the innovation in question, they have to predict the possible outcome and feelings that might result from the usage situation. Through observation highly accurate results on the topic studied, the benefits, shortcomings and much more are able to be received. Observation might also give light to additional problems or benefits about the topic of study, which would not have otherwise come up for instance in interviews (Proctor, 2005: 249).

4.6 Technical and Practical aspects

4.6.1 Consumer Interviews

To better understand what the situation with NFC payments in relation to consumers is six consumer interviews were conducted. Among the interviewed was one person who could be defined as an early adopter from characteristics, two who could be defined as early majority, one late majority and two laggards (Rogers, 2003). Interviewing different types of adopters makes it possible to make better assumptions on the overall opinion of consumers, not restricting the interviews to a single adopter type.

Most of the interviews were conducted via Skype, since it was the author's opinion that physical presence was not required. The interviews were all conducted within one week, having the same questions for everyone.

The interviews were structured, having sets of questions to be asked in a systematic order. The first set of questions were related to establishing a basic understanding on what was the preferred payment method of that particular consumer and what was his or her understanding of NFC payments. For example:

> "What types of payment methods do you usually use?"
> "What do you understand with NFC payments?"

The second set of questions had to do with understanding which features the consumers gave preference when selecting payment methods, in an attempt to evaluate what would be the influencing factors for adopting a payment method. In one of the questions the interviewee was asked to rank factors in the order of their importance:

> **1.** "Considering payments what importance would you give the following factors:
> **a)** Ease of use
> **b)** Perceived usefulness
> **c)** Costs
> **d)** Safety"

The third set of questions had to do with the willingness to adopt NFC payments at the moment; if the interviewees saw that with their current knowledge they would be willing to adopt NFC payments. Additionally, the consumers were asked what were biggest obstacles for them in adopting NFC payments and how likely it was that they would adopt NFC payments in the future.

4.6.2 Merchant Interviews

As the aim of this thesis was to understand the overall situation of NFC payments in Finland, the merchant side of the NFC payment ecosystem was also looked at. Interviewed for this thesis was Mr. Ari Vienola, chief of services, from the IT department of the Kesko Corporation, a large Finnish retail organisation, operating in numerous industries and countries. The second expert interviewed was Mr. Jari Jokela, head of mobile applications at Elisa Oyj, one of the dominant mobile network operators in Finland, also known now as one of the strongest supporters of NFC payments.

In the interviews, after introductions, a set of general questions were asked so as to understand why it was that these particular parties had involved themselves in NFC payments.

> "Why did you get involved in the process?"
> "Has it been a long process?"

The second set of questions had to with what they saw the benefits from adopting NFC payments being, for both the consumer and the merchant.

> "What are the benefits that you see the consumer receiving from adopting NFC payments?"

Additionally were asked opinions on the current situation of the diffusion process of NFC payments, is there demand for it and how the interviewed companies had through their own efforts sped up the process? What were the biggest obstacles in their opinion that were slowing down the process?

> "What have been the biggest factors in your opinion that have slowed down the NFC implementation process?"

Another set of questions asked what the perceived benefits that consumers and merchants would get from adopting NFC payments were. The last sets of questions examined the opinions on whether or not the interviewed felt that with the current benefits the consumers were willing to adopt NFC payments and what needed to be done to enhance the diffusion process.

Most of the questions asked from both interviewees were the same; however, some were slightly different and tailored to better match the field where that particular company operated in:

> "How does Kesko support the different phases of implementation of NFC processes within the organisation?"

4.6.3 Observation

Because the topic of study is arguably so complex, the author decided to physically go out and test NFC payments. An NFC payment sticker was acquired from Elisa for this research, for it was one of the most reasonable options for testing NFC payments. Tests were conducted in over the counter payment situations in two restaurants. Additionally vending machine purchasing was also tested, so as to see if the payment experience would differ from over the counter payments. The tests were conducted within a single day during the spring of 2013.

To help the reader understand how NFC payments work in practice, in the following section will be briefly explained the practical aspects of using NFC when making payments.

5 NFC payments in practice

In practice the functioning of NFC payments does not differ drastically from traditional card payments. The two biggest companies supporting the NFC payment systems can be said to be Visa and Mastercard, both of whom have already their branded NFC cards out on the markets; Visa payWave and Mastercard PayPass. Both of the previously mentioned function in similar fashion, thus we can apply the same example to explain both of them (Teachers Mutual Bank, 2013).

Figure 9 Visa Paywave, 11 March 2013,
http://usa.visa.com/personal/cards/card_technology/paywave.html

The payment procedure is explained rather simplistically in figure 9, showing the similarity to the traditional way of paying with a credit card, the major difference being that instead of swiping or sticking the card in the point of sale (POS) device, you bring it near it and the reader, in this case the POS device, reads the card, within which the NFC feature is, beginning the traditional transaction process (Visa, 2013).

When paying with a mobile phone that has NFC capability, as well as the secure element (SE) in it, (embedded or within a microSD card or the UICC (SIM card)), the process is technically very similar for payments. For a consumer to be able to pay with his/her phone, the phones do not only require the NFC capability and SE to be within the phone itself, but alongside they require an application on the phone, onto which they store their credit card, loyalty card and/or coupons (figure 10) (von Behren & Wall, 2011).

Figure 10 Google Wallet, 11 March 2013. http://googleblog.blogspot.fi/2011/05/coming-soon-make-your-phone-your-wallet.html

Using Google Wallet as an example; once a person has registered their payment details into the Google Wallet application and their phone has NFC capabilities as well as the SE, then in theory they are ready to pay with their phone at NFC POS devices (von Behren & Wall, 2011). However, as mentioned already earlier, integrated NFC payments in phones have still some technical difficulties to overcome, before they become reality, thus it is more likely to see payments done via NFC tags, or stickers, as has been seen now with Elisa and Mastercard in Finland (ePressi, 2013). A slightly more complex NFC payment process can be found in the appendix section of this thesis.

6 Findings

6.1 Expert Interviews

So as to better understand the non-consumer side of NFC payments, two interviews with experts were conducted. One of the interviewees represented Kesko, a large Finnish retail organisation which had started to implement NFC POS devices into their stores, as well as introduced a NFC based loyalty card already in the year 2012. The second interviewee represented Elisa, a large Finnish MNO, which has been heavily involved in the NFC payment process by introducing to the markets this spring NFC payment tags in collaboration with Mastercard. Elisa is also one of the most visible supporters of NFC payments.

6.1.1 Implementation process

The reasoning behind getting involved in NFC payments was different for both of the interviewees, seeing that they have different parts to play in the NFC ecosystem, Kesko being a merchant and Elisa an MNO/ card issuer.

Kesko had been planning NFC payments for a long time. Whilst they were renewing their POS devices to be compatible with the new chip card standards they also ensured that the devices would support NFC functionality.

> When the payment systems changed from magnet stripes to chip cards, we already then forecasted that NFC is coming and selected POS devices that would support NFC payments. **Kesko**

Kesko emphasised the importance of the consumer in their decision process by stating:

> We are interested in what payment methods are the consumers interested in using. Obviously, we have to have the ability to meet that needs of consumers….. NFC is one of these things and we want to be able to provide this option for them. **Kesko**

Additionally, it was mentioned that Kesko, although a large organisation, wanted to be an innovator in its own industry by adopting NFC POS devices and bringing out the NFC based loyalty card.

Elisa's operations having to do more with mobile phones, they stated that they saw the importance of the mobile phone becoming even larger in the future and that people would use their phones in payments. A reason why Elisa issued NFC payment stickers, to be put on phones, was that this would help the user get used to using their phone to make purchases. They also commented that the development process of NFC payments has been slow:

> There have been different kinds of challenges on the way. Initially there were a lot of difficulties from the mobile phone manufacturer's side, when the secure element was to be embedded in the SIM card. Having to wait for the manufacturers, postponed a lot of processes. **Elisa**

6.1.2 Collaboration in the NFC ecosystem

Both of the interviewees claimed that the involvement of multiple different players has slowed down the diffusion process a lot.

> A lot of it has to do with the different standardisation processes.
> There are a lot of different players on the boards (deciding on issues) and finding a common view on things can be challenging and time consuming. **Elisa**

> Partly it is the different players (slowing down the process). It is interesting to see the relationships between the different players, newcomers and traditional ones. **Kesko**

Elisa's representative brought up that they had indeed for years tried to collaborate with banks, in order to bring out NFC payments, without success.

> We tried to collaborate with banks for a number of years, not getting anywhere with them, thus in the end we formed our own finance company. **Elisa**

Nearly the same kind of situation was seen with Kesko, as they wanted to have consumers getting used to using NFC technology, but no one was issuing cards to use with the POS devices.

> There has been the problem of either not having cards or then POS devices, we wanted to provide both for our customers by bringing out the NFC loyalty cards. **Kesko**

Both companies used in a sense vertical integration, by providing services in the end by themselves, to quicken the diffusion process.

The lack of collaboration as well as "power differences" among the different players in the NFC ecosystem came up time and time again as a construct for the diffusion process of NFC payments. Both recommended more collaboration in order to enhance the diffusion process and Elisa particularly saw one player having possibly too much influence in the diffusion process:

> In Finland the POS device markets are perhaps too monopolistic and there could be more competition in that area. **Elisa**

Especially Kesko saw that the players should work together in communicating a strong unified message about the technology and its benefits to the consumer, much like was done earlier when chip card payments started:

> When chip card payments started, the official authorities were highly involved as were banks, central associations; they had a common strong message and unified communication. More unified measures are needed for the NFC. **Kesko**

The Kesko representative saw that there is confusion among consumers about the different terms used to describe NFC payments, which in its own part is deterring the whole diffusion process.

6.1.3 The Role of the Consumer

Particularly for Kesko, the consumer was said to be the number one reason on which they base their decision making in the organisation. Kesko said that they have in-house pilot experiments where they test out the new products before introducing it to the consumers. With NFC payments, they have had a gradual process of introducing it to the consumers, initially launching the NFC based loyalty card to accustom users to using contactless cards.

The representative from Elisa said that they had involved the consumer in their development process early on by doing a lot of consumer research and case studies. They also mentioned that they received constant feedback from their customers through different channels, such as online forums and through their lompakko service.

6.1.4 Benefits

Both parties interviewed saw that the main benefits received by the consumer from adopting NFC payments had to do with mainly convenience, ease of use and even security.

> Compared to Cash, the benefits are that your phone is nearly always with you. If you lose your phone, you can easily shut down the service, being able to reclaim the lost money, whereas with a normal wallet this is not the case. So security is definitely a key issue. Convenience is also a big issue, since you can easily keep track of all of your purchases via the application interface. **Elisa**

> Ease of Use, Convenience, that's what we want from payments, that it's easy for us and also for the consumer. **Kesko**

The Kesko representative also noted that the lack of having to type in PIN-codes would be beneficial for the visually impaired people or the elderly. What the store has to gain in implementing NFC payments is the increased efficiency of transactions, reducing the length of queues, thus also perhaps enabling stores to have less people manning the cash registers. Additionally, the decreasing amount of cash having to be handled at the registers would increase the security of the staff at the stores, lowering the risk of theft. Especially for bigger retail chains the reduced amount of cash delivery services required would add up to a lot of savings.

Although there are benefits to be received from adopting NFC payments on both the consumer's and merchant's side, the Kesko representative felt that there is a clear problem of consumers being uneducated about NFC payments.

> Even though we might have the card and the POS, if they do not know about it they might still stick to traditional payment methods. **Kesko**

This relates back to the problem of not collaborating together to educate the consumer. Both interviewees saw that it was vital for the success of NFC payments that the store employees would be educated in understanding the technology and operating the POS devices, since as the representative of Kesko put it:

> ...the first place where a consumer uses NFC payments is at the store and if they encounter a problem there, they aren't going to call the card issuer; they're going to ask for help from the cashier. So first things first, we need to educate our staff before going into the new payment methods. **Kesko**

6.1.5 Demand

Both interviewees seemed to believe that there is demand, at least to a certain extent, for NFC payments, since they had ventured into NFC payments, Elisa more strongly believing that even at this stage of the diffusion process there is demand for this kind of a payment method. Elisa said they supported the creation of demand by creating relationships with different brands, such as sports teams. They also aimed to distribute payment stickers to university students, through a student organisation, depending on the availability of POS devices. Indeed, when asked on whether or not they believed that the consumers would be willing to move away from traditional payment methods, purely based on the benefits received at the moment, the Elisa representative did not believe so, indicating that the lack in adoption rates is highly dependent on the amount of POS devices in store:

> At the moment the biggest challenge is the POS devices, or lack thereof. They have been delayed numerous times. Abroad you have numerous payment locations. We have fallen behind in this technology in the Nordic countries. **Elisa**

When discussing the possible future usage amounts of the NFC and whether the interviewees thought that it would replace traditional methods of payment, neither saw that it would directly be competing with credit or debit cards or even at times cash, but moreover it would be an addition to the payment method portfolio:

> I believe that we will start to see a combination of different payment forms, having credit cards, cash and NFC in their pockets. **Kesko**

6.2 Consumer Interviews

Six consumers from different demographics were chosen to be interviewed, so as to have a view on what the current knowledge of NFC payments is among the common consumers. Based on personality, age, occupation and other factors influencing consumer behaviour, the interviewees were found to represent 4 different consumer types. Among the interviewees was one *Early Adopter,* a technologically savvy young person who worked in the mobile industry, a student belonging to the *Early Majority,* two students belonging to the *Late Majority* and two people who could be described as *Laggards*, when it comes to innovations (Rogers, 2003).

6.2.1 General opinions on payments

When asked about the preferred payment method of the interviewees, most of them favoured using a payment card over cash; only the Early Adopter and Late Majority 1 stated that they preferred using cash. The Early Adopter stated that he preferred to use cash because "it is accepted everywhere and making it the easiest option for me." When looking at the importance of different factors in relation to choosing a payment method, the safety and the security of the method was brought up frequently by many. Safety was seen to be the most important element for laggards, but also important for some of the other interviewees.

> …in the long-run safety and ease of use would be of greatest importance to me. **Late Majority 1**

Ease of use and convenience were clearly the most important factors in the adoption process for the interviewees.

> Convenience and the fact that it is accepted everywhere and is easy to use are most important. **Early Adopter**

> I'd say it has to be easy to use… **Early Majority**

> Ease of use has an importance as well, since at this age you do not want to learn anything new anymore. **Laggard**

As mentioned most of the interviewees saw that convenience and ease of use was the most important aspect for a payment method, but half of the respondents were strongly against the idea of having to pay for getting some benefits in purchasing, as the Early Adopter mentioned:

> I would never be willing to pay for payment methods. It is not the business of firms to take money from using the payment methods.
> **Early Adopter**

The people belonging to the laggard group saw that they would be willing to pay for the extra benefit received.

> I would be willing to pay for some payment mean that would be convenient and safe, especially if it would save me time. **Laggard 1**

> If it would help in everyday life I would be willing to pay for it. **Laggard 2**

One of the late majority interviewees also stated that she would be willing to pay some amount yearly, but not based on usage.

When considering the people interviewed, it is evident that convenience is the most important factor for them when choosing a payment method. However, many were not willing to pay for the added convenience factor whilst at the same time all pointing to the direction that the payment method should also be safe and secure to use.

6.2.2 General knowledge of NFC payments

After already the first few interviews it became obvious that there was plenty of confusion among consumers about what NFC or proximity payments truly meant and most of the interviewees had not come across NFC, at least in terms of payments. Only the *Early Adopter* and the person belonging to the *Early Majority* were able to say with confidence that they had a better understanding on what NFC actually meant. The people belonging to the *Late Majority* understood it had something to do with your phone and waving it in front of the payment device. The interviewees belonging to the

Laggard type stated that they had no knowledge on the topic. There was also some confusion among the respondents, relating NFC payments to quick response (QR) codes.

When asked if they had come into contact with NFC payments, the respondent nearly unanimously said that they had not seen it a part from a couple of exceptions, where it has been brought out through branding.

> I have not really come into contact (with NFC payments). Mainly through my sports team that the company issuing NFC payments sponsors and a friend also introduced me to the concept. Otherwise I haven't heard anything about NFC payments in Finland. **Early Majority**

Most of the interviewees stated that they had received no information on the topic. Some had seen payment devices in supermarkets or it being mentioned in magazines, but not having received any information on the payments personally.

6.2.3 Willingness to adopt NFC payments

Once the interviewees were educated on the matter of NFC and told about the benefits that it should provide its users with, their opinions were asked on whether they would be willing to adopt such an innovation at the moment. All of the respondents said unanimously that they required a lot more information on NFC payments also wanting to test it first.

> I would require more information on it, since at the moment I do not have any knowledge on the subject. First I would need to be able to test it out.
> **Laggard 1**

> I would need more information on it definitely, but in theory it sounds nice…. I could start to use it. If I could first test it, of course.
> **Late Majority 1**

In the opinion of the interviewed, the perceived benefits of NFC payments were not advantageous enough at the moment to convert them away from using traditional payment means, although most of them were more than willing to trial it, if they had the chance.

> Purely based on the benefits received, I would not be willing to take it into use. **Early Majority**
>
> At the moment I do not have any need for it, because I do not know enough about it and the possibilities of paying with it are limited. I would need to be educated on the concept of using it, if I were to ever adopt it. **Late Majority 2**
>
> I would be willing to try it out…. I would have no problem in trying it out, but I would not do extra work in order to be able to test it i.e. I would not travel to places just to use this payment method. In my opinion there is not a large "hook" to this payment method. **Early Adopter**

When asked about whether they think that they would need it in the future, many respondents said again that they would gladly test it, but that it would have to be a widely accepted payment method before they would take it into use and even then, they would have to be educated on the usage of it.

> Perhaps in the future once there will be more knowledge on it and it is secure and would not create too much additional costs, then yes. **Laggard 1**
>
> If someone were to help me in using it. The convenience factor enough to convert to use. **Laggard 2**
>
> I would gladly at least test it out. **Early Adopter**
>
> Perhaps (I would use it) in the future, but not at the moment. **Late Majority 1**
>
> There are not enough benefits received from it at the moment, no information, no payment locations. If there are only a few available locations where I could pay with it, it would not be worth it. **Early Majority**
>
> If it were to become a common currency, then yes I might adopt it. **Late Majority 2**

6.3 Field Testing

At the time of writing, there were only a handful of providers of NFC payment methods in Finland. Osuuspankki was the first bank in Finland to implement the NFC payment feature into its Visa Debit cards, doing this already in late 2012 (Osuuspankki, 2012). Nordea, another Nordic bank, just recently announced that it would start shipping all new Visa Debit cards with the NFC feature embedded into them as well as updating older cards by April, to have the NFC payment capability (Nordea, 2013). Other banks have also discussed the possibility of bringing NFC payment cards to the markets during this year, but have so far not yet done so.

Perhaps the most active promoter of NFC payments in Finland has been a mobile network operator (MNO), Elisa. Elisa brought out in February their electronic wallet service *Lompakko.* Lompakko is planned to be in the future a similar application as Google wallet or any other mobile wallet, in the sense that users will be able to store their credit card information onto the service and utilise the NFC capabilities of their phone, in the future. At the moment, as discussed in earlier chapters, phones are lacking the secure element (SE) which is why Elisa has partnered up with Mastercard to provide NFC stickers (tags) with which a user can make purchases. How it works in practice is that a user transfers money from his or her existing bank account to his or her newly opened Elisa Lompakko account, which is linked to the payment sticker provided in collaboration with Elisa and Mastercard. Once a consumer uses their sticker to make a purchase, the Lompakko account is then charged accordingly (Elisa, 2013)

For test usage was chosen the Elisa Lompakko service, since at the time of testing it was not clear whether it would be possible to acquire a NFC payment card from the banks mentioned earlier.

6.3.1 The Acquiring Process

The set up process of the Elisa Lompakko account was made fairly easy, since all that was required to be done was to personally walk into an Elisa store, after which their clerks guide one through the whole process, which took roughly half an hour. Normally

when a consumer opens an account he or she has to pay €5 for the payment sticker as well as wait for it to be shipped to them, however when registering in-store for the service the sticker is given free of charge and immediately to the consumer. With the sticker there was the option of a branded sports-team version or a more traditional looking Mastercard version, of which was chosen the first one mentioned, which can be seen in figure 11.

Figure 11:NFC Tag, Rinne (2013)

After the account was set up the next step was to transfer money from an existing bank account to the Elisa one, which was fairly easy seeing that it could be done via online banking.

6.3.2 The Testing Facilities

One of the most difficult parts the test phase was actually locating places which accepted NFC payments. Even though, many of the POS devices at a variety of stores have the ability to in theory accept NFC payments, they have not yet been certified for use. Nets, alongside other operations, provide POS devices and have been the first one to receive certifications from Visa and Mastercard for their payment devices to accept NFC payments (Nets, 2012). They have been running beta testing of the POS devices in a handful of places restaurants, nearly all located in Helsinki and arguably hard to find. Supposedly, according to rumours, there were also a few vending machines that accepted NFC payments at the Helsinki-Vantaa Airport. It was decided for this thesis to test both over the counter means of paying as well as the vending machines.

6.3.3 Selecta Vending Machines – Helsinki-Vantaa Airport

The machines themselves were rather standard vending machines (Figure 12), not being difficult to use, the only difference was that they accepted credit cards as well as NFC payments alongside coins.

Figure12:NFC Vending Machines, (Rinne, 2013)

The purchase process itself was surprisingly easy. Once one had located NFC reader one simply put one's NFC sticker on top of it, afterwhich the machine in a second showed the balance of the card on the screen and thereafter one only had to select the product and wait for the transaction to be completed. The process is visualised in figure 13.

Figure 13: Vending Machine Payment Process (Rinne, 2013)

The process went well, until the authorisation part of the transaction, at which point the machine gave a notification that the transaction could not be completed. Both of the machines were tried numerous times, with different products, but always with the same result.

6.3.4 Restaurants

Locations where NFC payments are accepted at the moment are scarce; it took a lot of researching to find a few restaurants where NFC payments could be tested. At both of the locations where NFC test payments were conducted, the author was confronted with a lot of confusion. The employees were very confused as to what NFC payments were, the author having to spend a considerable amount of time in explaining to them first-hand what NFC is and how it works. At the first location once the theory behind NFC and what was desired to be done had been explained, it took another good 10

minutes for the staff to find a person amongst them who knew if they had a device that could receive NFC payments. In the end, one employee understood what was being discussed and dug behind the counter to find a NFC POS device, which when powered on was able to process the NFC sticker very fast and the transaction took no more than approximately 5 seconds. A confusing observation was also that this location had a POS device visible in-front of the counter that had the NFC feature on it, but apparently had not been activated.

Figure 14:POS Device (Rinne, 2013)

At the second location the author was met with even more confusion, as the employee at the counter called her superior to whom had to be explained the purposes of the test, after which the superior told the employee at the counter what was to be done. In fact, at this location the entire payment process was left to the author; from setting the price to operating the machine, since the employee had not used the NFC POS device before (Figure 14).

6.3.5 Results

As it turned out, the buying process was, as promoted, very convenient. Once the NFC sticker had been placed on top of a NFC reader, the transaction process took only a couple of seconds, which is already considerably faster than having to type in your PIN-code with a traditional payment card or pay with cash. It was indeed very easy to use and simple, not having to remember one's PIN-code or having to count the right amount of cash to pay for a purchase. Security wise, the transaction process was not

seen as particularly safer with this payment method, but it is obviously a benefit when there is not a need to type in your PIN-code, in a potentially highly populated place.

On the other hand, there were a lot of issues that raised thoughts which could discourage paying with the NFC tag. Firstly, daily plans had to be changed and time taken to go and acquire this payment method. Secondly, finding locations where one could test NFC payments was surprisingly difficult. Having navigated mostly based on rumours, since there is no official list available where would be shown the locations that support NFC payments. Thirdly, the lack of knowledge by the staff at the test locations made paying for a cup of coffee a harder task than it should be. At both locations where staff was present the author had to first spend time explaining what it is that was wanted to be done and what NFC is, already discouraging the usage NFC payments.

7 Discussion

7.1 Consumer Behaviour

7.1.1 Cultural Factors

In general when looking at purchasing behaviour, especially in the context of what payment method do people prefer to use, it was found that at least among the interviewed consumers there was a preference to pay with credit or debit cards if they had the chance, only a few choosing to go with cash. The preference for cash payment by the couple of respondents is perhaps explainable by the fact that they had lived abroad, thus become accustomed to using cash, since card usage differs from country to country. Finland ranks among the top countries when categorised on the basis of non-cash transactions per inhabitant, therefore it is not surprising that most of the respondent preferred to use card (Capgemini,RBS & EFMA, 2011: 11). Arguably cultural factors (Kotler, 2008: 240-260) seem to have a strong influence on the choice of payment method.

7.1.2 Social Factors

People are to a certain extent sheep, in that they do follow the opinions of their peer groups, even though they might not want to acknowledge it (Gladwell, 2001: 30-89). With NFC there seems to be a situation where there are no strong reference or aspirational groups really adopting it, relating to the fact that the whole innovation is still in the early stages of the technology adoption lifecycle (Kotler, 2008; Rogers, 2003). Only Elisa said that they were looking to target the sports fans of a certain ice hockey club as well as students and this was seen to work, at least in raising awareness. This was noted in the observation part of the research and in the comments of one consumer interviewed, who stated that he knew of the innovation because of the collaboration between his favourite sports team and Elisa. Nevertheless, for others there does not yet seem to be a lot of groups that would encourage users to adopt NFC payments, which would indicate a direct need for identifying the target groups and the opinion leaders more efficiently.

7.1.3 Personal Factors

It was rather predictable already before conducting the consumer interviews that the answers of different adopter types would differ. It is understandable that the so called *laggards,* who in the case of these interviews were older an also better off financially than the rest of the respondents, would have differing attitudes towards innovation. It was interesting to see that even with the so called *early adopters* and *early majority* there was a considerable amount of doubt towards the innovation, both groups contemplating whether or not they would indeed see a need for NFC payments. As covered in the theory part of this thesis, beliefs and attitudes in part work to guide consumers in their behaviour. In a good situation, these beliefs and attitudes would be based on facts, enabling users to arguably make rational choices. In the lack of knowledge and facts, the opinions of others and essentially faith guide us in our decisions (Kotler, 2008: 265-272). If others around you do not have faith in NFC payments why should you? Normally such a question would be answered by facts and educated arguments, but in the context of NFC payments this does not seem to be the case.

Consumers were found to be uneducated on the matter of NFC, not only in general, but especially in terms of payments. There was already a lot of confusion in the interviews when discussing the terminology. The lack of knowledge became especially clear during the observation phase of the research conducted for this thesis. The author had to by himself educate the cashiers on what the technology is and how to even use it. The lack of knowledge can partially be explained by consumer behaviour, since if not even the so called *early adopters* are fully convinced and understand the concept, how are they supposed to convey the benefits of the innovation to the *early majority* and so on, as they are arguably according to Moore (1999: 27-63) supposed to do? This would indicate that there is a problem in getting through to the *innovators* and *early adopters* who could generate hype for this kind of an innovation, which would then help propel it over to the majority of users (Moore, 1999: 27-63).

It is hard to believe that there would be a lack of knowledge on the topic per se, but moreover it is the author's opinion that there is a definite lack of delivering that available knowledge to the consumer. This view was also shared by both of the

merchant side interviewees. The representative of Kesko noted that he felt that there was a significant amount of confusion among the consumers about the innovation. The interviewee from Elisa also saw that parties were not collaborating enough to inform the consumer about the benefits and usage of NFC payments. Keeping these opinions in mind, it is fairly easy to start to understand why perhaps there is not such a great demand for NFC payments.

7.2 Consumer Decision Process

Looking at the decision making process of consumers, the first step would be to recognise a need (Kotler, 2008: 265). In terms of NFC payments, it can be argued that a need for such payments has not been recognised by the consumers, this relating back to the lack of knowledge. If the consumers are reasonably happy with the current methods of payment, arguably they are not looking to change their payment methods. The merchant side of the interviews claimed that there are significant convenience and security factors that would be beneficial for the consumer, these comments are consistent with many secondary research reports, which have suggested that convenience and security would be some of the major advantages of NFC technology (NFC working group, 2011; Smart Card Alliance, 2011; Mallat, 2006). Nevertheless, it is to be said, that when no one communicates these perceived benefits to the consumer, or contrasts them with the benefits received from using current payment methods, the user does not arguably feel the need to go out of his/her way to acquire this new payment method (Kotler, 2008: 265-272). As mentioned by Kotler (2008: 265-272), people have a tendency to avoid risk and when they are not sure about the outcome of a purchase/adoption they might postpone making the decision on whether to purchase/adopt or not. Kotler's (2008) writings go hand in hand with the comments from the Kesko representative who campaigned for unified communication on the innovation to the consumers. By having a single clear message on NFC payments and the different aspects related to it, it is much easier for not only *innovators,* but for basically anyone to grasp the idea of why one should arguably adopt NFC payments. Understanding merely the concept does not yet guarantee adoption.

7.2.1 Payment Method Selection

As discussed in the writings of Schreft (2006), as people are making their payment method decisions, there are a number of factors influencing them. For NFC payments a problem is posed in the sense that arguably they should be competing against cash, as per the opinions of both merchant interviewees, but the preferred method of payment for most in Finland seems to be cards (Capgemini,RBS & EFMA, 2011), thus this would indicate that in fact NFC payments would often perhaps be compared to card payments, rather than to cash transactions, in the mind of the consumer. Another troublesome issue is the lack of POS devices. The representative of Elisa pointed out, that the lack of POS devices has considerably slowed down the diffusion process of NFC payments. As Schreft (2006) mentioned, the consumer's choice on payment method depends highly on the acceptance of payment, as in the consumer is not going to carry a payment method which he/she cannot use. This theory is supported by the findings of the consumer interviews as well as the observations made by the author during the field testing phase. The author felt that the lack of availability of payment devices highly discouraged the further usage of NFC payments.

7.2.2 Technology Acceptance Model

When purely looking at the different factors that would arguably contribute to the adoption rates and demand for NFC payments, the theories from Davis (1989), Tan & Co. (2011) and Amin (2007) were partially supported by the research findings. The perceived credibility, or in other words safety and security has an impact on the decision which payment method to use, especially for the *laggard* adopter type, it was more evident that the payment method to be chosen should be safe. According to Davis (1989) originally, the perceived ease of use was seen nearly as a precondition for perceived usefulness, and many people mentioned in the interviews that convenience is one of the key factors influencing their opinions on payment options. Through test situations was confirmed that the NFC payment is indeed extremely convenient and easy to use. Although, to actually receive the convenience benefit of the fast transaction process, one should not have to go to such great efforts in actually making it to the purchasing step, as had to be done with the field tests. This would yet again

point towards the problem the lack in educating the employees on using the technology, as well as towards the POS device distributer for not spreading the devices efficiently enough. The Kesko representative did note that on their side they see the educating of staff as a key element for the success of NFC technology and that they do work on educating their people in the usage of NFC, adding again that it should not be the sole responsibility of single parties to educate consumers in the usage of NFC payments, but a unified effort is needed from all parties involved in the development process.

Indeed, even though the usage situation is quick and convenient, arguably the usefulness of NFC payments suffers from the limited amount of locations where one can use them, thus also hurting already the probability to adopt the payment method, since it is not seen as that useful (Davis, 1989).

Most interviewed people also stated that they were not willing pay for the aforementioned possible benefits. This can be also seen to hinder the adoption process, since arguably people would not be willing to pay €5 (postage) for a payment sticker that they could not even yet use in most stores.

When asked point-blank if the consumers were willing to adopt the NFC payments, none of them were willing to automatically adopt it, but nearly all were partially open to at least testing it if the opportunity were to come and there was information on it. Similar responses were gotten from the two representatives from Kesko and Elisa, stating that they did not believe that the current benefits received are enough to attract users to jump to using NFC payments instead of another payment method, but rather to perhaps complement the existing methods.

7.3 Diffusion of Innovations

By observing the different diffusion theories and the findings of this thesis can be said that NFC payments still have a rather bumpy road ahead of them, before they make it to the mainstream markets. Looking at the five stages belonging to the process of adopting a new product: awareness, interest, evaluation, trial and adoption (Rogers, 2003: 168-169), from the findings can be observed that at least in the case of the interviewed consumers NFC payments had barely made it to the awareness phase and

because of lacking information on this innovation. Even for the ones wanting to adopt NFC payments after having tested it, it is hard to take into use as an everyday payment method, since one cannot use it in many places.

7.3.1 Diffusion of High-Tech Innovations

If thought in terms of the "crossing the chasm" problem (Moore, 1999), as in getting NFC payments to the average users, there have been attempts from the merchants in supporting the crossing process. Kesko mentioned that they have introduced both NFC based loyalty cards as well as the POS devices into their stores, so as to train the consumer in preparation for NFC payments. Elisa told that they have been working together with a Finnish sports team to raise awareness. Having strong familiar brands such as Kesko and Elisa by themselves, supporting the NFC technology, already speeds up the diffusion process of NFC payments. The results of their efforts could already be seen in the consumer interviews, where some could name Elisa as a NFC payment provider and one person connected NFC payments to the sports team. As mentioned by Moore (1999), the bigger the innovation introduced is, the bigger the hype and momentum behind the product should be. The preference for using cards for payments in Finland (Capgemini,RBS & EFMA, 2011) could on its own part slow down the enthusiasm towards NFC payments, since NFC payments are at least according to the experts interviewed, targeted to attract users away from using cash and because of the limited amount of people using cash in their everyday life, the NFC could in fact be competing with credit and debit cards, which have nearly the same set of benefits already as the NFC would arguably have.

Elisa has targeted the innovators and early adopters, by trying to introduce their payment method to students for free. However, even this process has been surprisingly bumpy and slow because of POS device provides, according to Elisa. For basically the same reasons, Kesko decided to put out its own test with NFC loyalty cards, since no one was issuing NFC based cards, so as to familiarise consumers with the technology.

7.3.2 Diffusion of Systemic Innovations

From all of the observations made during the research can be said that there is a definite need for more collaboration among the different players to get this innovation over the chasm. The product itself has proven to be good. Based on observations from the field test, it is convenient, easy to use and safe. The major problem seems to be with NFC payments, according to interviews with the merchant side the lack of collaboration among the different players in the NFC ecosystem. There are a lot of parties interested in the possibilities of NFC payments, but only a few are taking concrete measures in promoting it to the consumers, resulting in the findings of the consumer interviews, where it was found that many had basically no idea what NFC was. Relating to the theories of Taylor & Levitt (2005), can be said that the fragmentation of the markets, as in that there is a single company in charge of a single function is slowing down the diffusion process significantly. The representative of Elisa mentioned that the standardisation process of different features was slowed down a lot because of the large number of different players involved. Another good example from Elisa, of the lack of collaboration was that they had for years tried to collaborate with banks so as to bring out NFC payments, without success. As noted by Taylor & Levitt (2005) many companies in a situation of fragmented markets decide to vertically integrate their operations, so as to speed up the diffusion process on their behalf, which both Kesko and Elisa were seen to have done.

7.3.3 Innovation Adoption in Retail Environments

What was obvious from the interviews with both Kesko was that the consumer, as theorised by Hristov & Reynold (2007), is the key driver for innovation in the retail sector. When considering the overall success of NFC payments, Kesko was not seen to on their own behalf slow down the diffusion process. Kesko in fact claimed that they aimed to be an innovator in the retail sector by introducing NFC technology slightly before other players in the industry. In terms of consumer involvement Kesko mentioned that they do a lot of in-house testing before launching anything to the public. However, it could be argued that in the case of Kesko introducing the possibility for NFC payments to the consumer, that the decision was made based on predicted

future demand and not current consumer demand, since what was obvious from the consumer interviews was that consumers were highly uneducated on the topic of NFC payments, thus, it is unlikely that the consumers were the ones driving this diffusion process, at least directly. Elisa explained that they have involved the consumer in the NFC payment development process, by researching consumer behaviour and constantly gathering feedback from users through different channels, basing their decisions arguably more on present day demand. The aforementioned issues would indicate that the diffusion process of NFC payments is not one driven by the consumers, thus, could also help explain the length of the process better as well. It is still to a certain extent questionable what the true demand at the moment for NFC payments is, seeing that in the past years many have suggested the year to follow to be the one when NFC payments will get properly started (Pitkänen, 2011), but as is known by now, a strong breakthrough of NFC payments still awaits itself. Some have argued that 2013 will be the year when NFC payments will be a common sight in stores; however, it is hard to say whether this will happen, since it seems that there are still barriers to overcome between the different players involved in the diffusion process of NFC payments (Yle, 2013).

8 Conclusions and recommendations

The purpose of this thesis was to see if there was in fact demand for NFC payments and what the general situation with NFC payments in Finland was, concerning the diffusion process of this innovation. An additional aim was to see if the perceived benefits received from NFC payments are enough at the moment to attract users to adopt this new payment method.

There was a limited amount of research available on the opinions of both the consumers as well as merchants towards NFC payments in Finland. For this reason, as well as to be able to answer the issues mentioned earlier, primary research was conducted in the form of in-depth interviews and observation.

The findings from the primary research indicated that there was a lack in consumer demand for NFC payments, due mainly to the lack of knowledge and consumers being uneducated on the benefits and usage of NFC payments. Most of the consumers interviewed were not willing to adopt NFC payments at the moment, based on the current knowledge they had on this innovation.

From the research can be said that, when used, the NFC payments were very convenient, safe and easy to use when at the point of transaction. However, the lack of knowledge of payment locations as well as not having cashier employees educated on the technology severely discourages the usage NFC payments and also decreases significantly the overall convenience factor of paying with NFC.

Another major finding from the research was that the lack of collaboration among the different players involved in the diffusion process of NFC payments has considerably slowed down the diffusion process. There was a significant problem seen with the shortage of POS device providers. Both of the interviewed companies had to resort to vertical integration so as to speed up the process of introducing NFC as a technology to their consumers. Other technical standardisation processes have also taken their toll on the diffusion process, slowing it down even more.

The lack of collaboration is seen as the main reason for uneducated consumers, seeing that there is arguably a lot of information available on NFC payments, but not many parties are spreading that information to the consumer. NFC payments lack the similar kind of collaboration that was had with smart card payments, where many authorities had a strong unified message that was then communicated to the consumers so as to decrease the perceived risk and uncertainty towards using the new payment method.

Since NFC payments are by definition a systemic innovation, it is vital that the different parties involved in the introduction process of NFC payments, would work together to increase consumer knowledge on the topic. One way of enhancing this informing process would be to create a central body for overseeing the spread of information so as to ensure that all the available information on NFC payments finds the end user as well. NFC payments as a technology have been proven to work and when tested were found to be everything that they were promised to be; convenient, fast, safe and easy to use. It is the author's opinion that it is not the innovation that is flawed and slowing down the diffusion process, but it is the cooperation among different companies involved in the development process that are slowing down the diffusion process, often because of looking only at their own interests. The benefits of a wider spread of NFC payments should not only be communicated to the end consumers, but also to merchants and other players involved in the process, so as to encourage a mutual effort for pushing NFC payments to be a common method for payments.

A limitation for this study was the small sample of interviewed consumers and merchants. So as to have a better understanding of the overall opinions of merchants and consumers in Finland, a larger study with a larger sample size should be conducted.

Further research should be conducted to solve how the consumers could be educated more efficiently on NFC payments and whose responsibility is it to educate them? It should be also researched whether or not there is enough support for the different players considering innovation adoption. Could support from the state, speed up the diffusion of innovations? Additionally it should studied whether or not certain players have too much power in the NFC payment ecosystem, such as the POS device providers, and are those players hindering the diffusion process of new payment

forms? Some of the players involved in the diffusion process of NFC payments are arguably alone big enough in the Finnish markets to accelerate the innovation adoption process, by raising their voice more on the matter, thus also raising the interest of the consumer and eventually creating consumer demand for NFC payments, which would speed up the diffusion process. The Finnish players involved in the NFC diffusion process, should look closely at other countries where NFC payments have already been implemented and learn from those examples, so as to not in any case repeat possible mistakes made in those markets.

There is arguably a lot of enthusiasm behind NFC payments and most likely NFC payments will eventually become a payment method used by if not all, then the majority of Finns. However, the timeframe for the adoption of this new technology depends highly on the cooperation of the parties involved in the NFC ecosystem, since at its current state NFC payments are not yet seen as attractive enough for the common consumer to adopt them.

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Appendix 1. The Complex NFC Payment Process

To help understand the process of paying by NFC (or credit card for that matter) the following is a slightly more detailed explanation of the payment process.
As credit card and NFC payments have arguably the same processes for carrying out transactions, Visas example of how the transaction process is done will be looked at. The process is explained by Visa (and visualised in Figure 15).

> When a Visa account holder uses a Visa card to buy a pair of shoes, it's actually the acquirer — the merchant's bank — that reimburses the merchant for the shoes. Then, the issuer — the account holder's bank — reimburses the acquirer, usually within 24 to 48 hours. Lastly, the issuer collects from the account holder by withdrawing funds from the account holder's bank account if a debit account is used, or through billing if a credit account is used." (Visa, 2013)

Figure 15 Visa Payment Process (Visa, 2013).

Even the model, visualised in figure 15, lacks some players that are present in NFC payments, which would arguably be situated between the different phases of figure 15.